Lecture 7

Loss Aversion and Endowment Effects

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PS4168: Economic Psychology

Overview

- Recap on Loss Aversion
- Background to Endowment Effects
- Studying Endowment Effects
- Activity

Recap on last week!

- What is discounting?
- What is the Somatic Marker Hypothesis?
- Identify examples of emotions influencing decisions

Before we Start

https://docs.google.com/forms/d/e/1FAIpQLSfUlhwwnwn32eCLB13Pzq5IU6PsLwknvHDsFTPcyiqjQIXcfQ/viewform?usp=sf_link

Risk of Death

- Consider the following:
  - Assume you have been exposed to a disease which if contracted leads to a quick and painless death within a week
  - The probability you have the disease is 0.001
  - What is the maximum you would be willing to pay for a cure?
  - Suppose volunteers were needed for research on the above disease
  - All that would be required is that you expose yourself to a 0.001 chance of contracting the disease
  - What is the minimum payment you would require to volunteer for this program? (You would not be allowed to purchase the cure.) (Thaler, 1980, pp. 44–45)

Travel Mugs

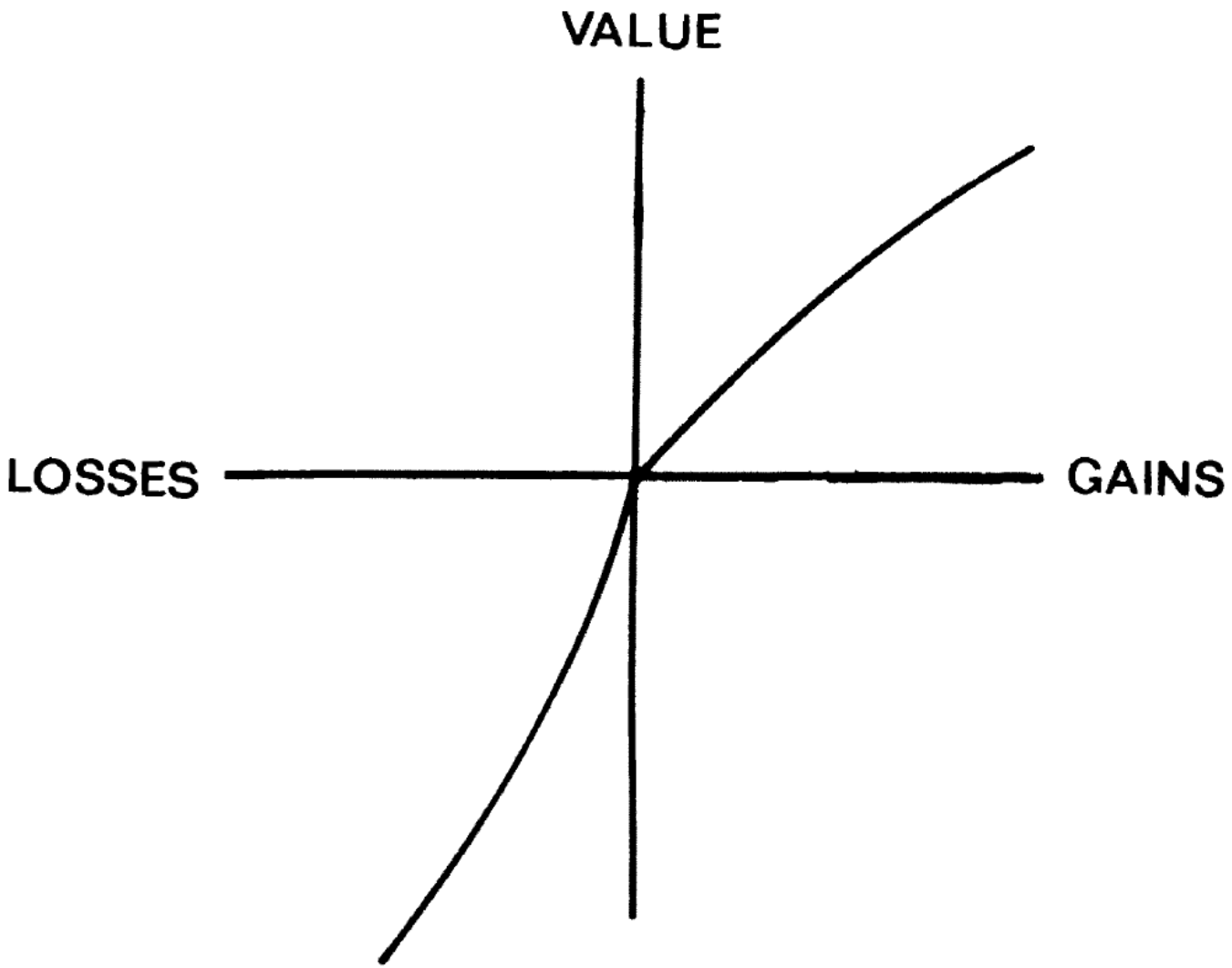
Battery Pack

Loss Aversion

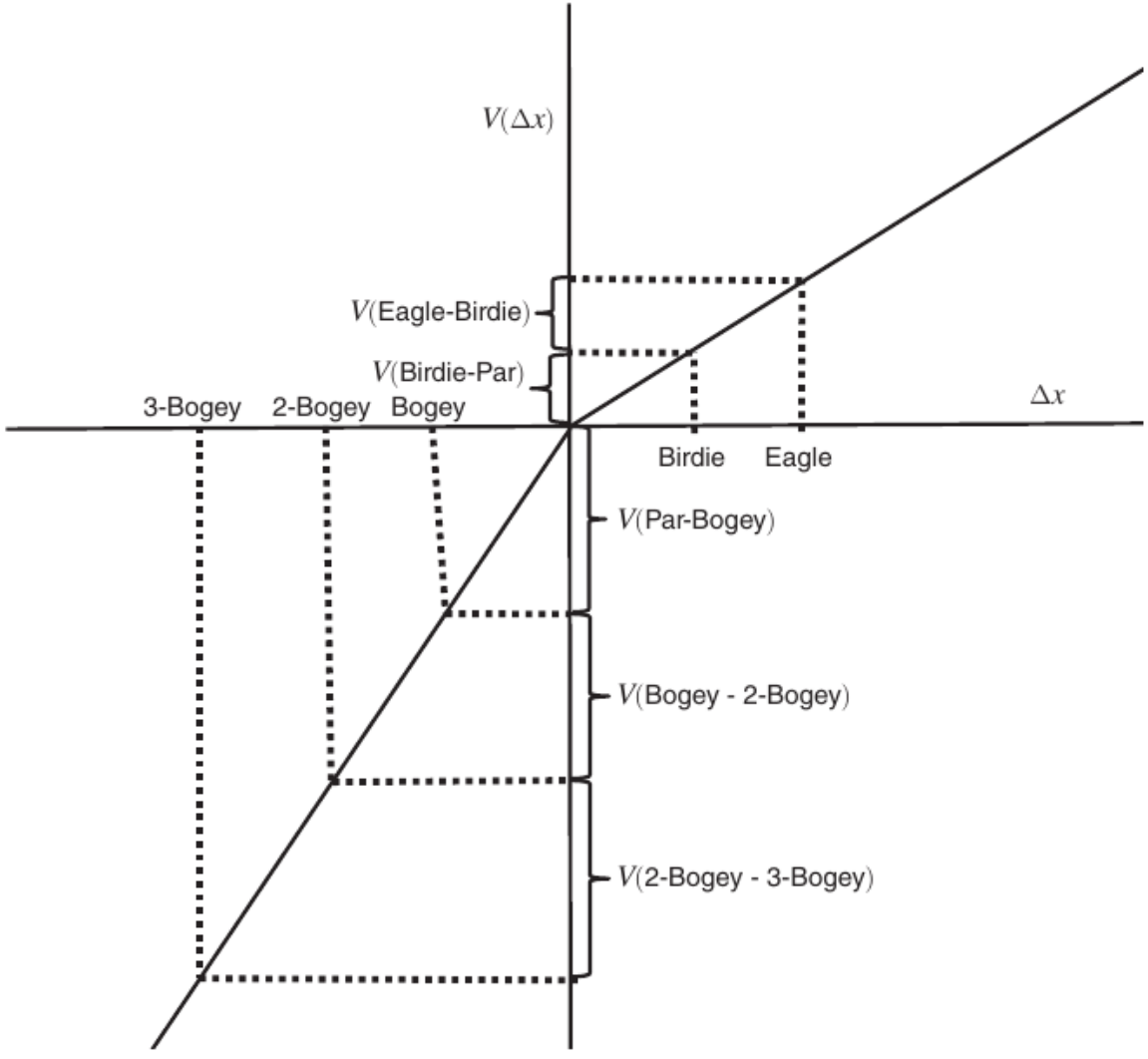
Loss Aversion

- Definition?
- "Losses are weighted substantially more than objectively commensurate gains" (Kahneman, Knetsch, & Thaler, 1990, p. 1326)
- "we suffer more . . . when we fall from a better to a worse situation than we ever enjoy when we rise from a worse to a better" (A. Smith, 1759, p. 311; see Camerer, Loewenstein, & Rabin, 2003, p. 5)

Loss Aversion



Loss Aversion



Birdie Putt

https://www.youtube.com/embed/6BUf1HJwZZU

Par Putt

https://www.youtube.com/embed/h5srXSfQm-s

Language to describe shots

- Spieth misses birdie putt
- Graeme McDowell's brilliant par save at Bridgestone

'Classic' Loss Aversion

- Advertising
  - *"Limited-time offer!"*
  - *"Everything must go!"*
  - *"This opportunity disappears at midnight!"*
  - *"Don't miss out! Act now!"*
- Sunk cost effect
- Examples of both sunk cost and Loss Aversion?

Endowment Effects

Subjective Value in Economic situations

- The subjective value of something can be described in terms of
  - The maximum a person is willing to pay for it *willingness to pay* (WTP)
  - The minimum compensation demanded for it *willingness to accept* (WTA)
- **Coase Theorem**: "subject to income effects, the allocation of resources will be independent of the assignment of property rights when costless trades are possible" (Kahneman et al., 1990, p. 55)
- When income effects are small
  - *willingness to pay* should be equal to *willingness to accept* (or should be "negligible" Kahneman et al., 1990, p. 55; Willig, 1976)

Coase Theorem in Real Life

- Thaler (1980)
  - The minimal compensation demanded for accepting a .001 risk of sudden death (WTA)
  - The amount people were willing to pay to eliminate an identical existing risk (WTP)

Coase Theorem in Real Life

- Questions worded as follows:
  - Assume you have been exposed to a disease which if contracted leads to a quick and painless death within a week
  - The probability you have the disease is 0.001
  - What is the maximum you would be willing to pay for a cure?
  - Suppose volunteers were needed for research on the above disease
  - All that would be required is that you expose yourself to a 0.001 chance of contracting the disease
  - What is the minimum payment you would require to volunteer for this program? (You would not be allowed to purchase the cure.) (Thaler, 1980, pp. 44–45)

Our Results

https://cillianmacaodh.shinyapps.io/week_8/

Thaler's Results

WTP $= 200$ WTA $= 10{,}000$

Thaler's Results

- Huge difference between WTP and WTA
  - The amount people were willing to pay to eliminate an identical existing risk (WTP)
  - The minimal compensation demanded for accepting a .001 risk of sudden death (WTA)
- Specific to life/death situations?

WTP vs WTA

TABLE 1

SUMMARY OF PAST TESTS OF EVALUATION DISPARITY

	Means			Medians		
STUDY AND ENTITLEMENT	WTP	WTA	Ratio	WTP	WTA	Ratio
Hypothetical surveys:						
Hammack and Brown (1974): marshes	$247	$1,044	4.2			
Sinclair (1978): fishing				35	100	2.9
Banford et al. (1979):						
Fishing pier	43	120	2.8	47	129	2.7
Postal service	22	93	4.2	22	106	4.8
Bishop and Heberlein (1979): goose hunting permits	21	101	4.8			
Rowe et al. (1980): visibility	1.33	3.49	2.6			
Brookshire et al. (1980): elk hunting*	54	143	2.6			
Heberlein and Bishop (1985): deer hunting	31	513	16.5			
Real exchange experiments:						
Knetsch and Sinden (1984): lottery tickets	1.28	5.18	4.0			
Heberlein and Bishop (1985): deer hunting	25	172	6.9			
Coursey et al. (1987): taste of sucrose octa-acetate†	3.45	4.71	1.4	1.33	3.49	2.6
Brookshire and Coursey (1987): park trees†‡	10.12	56.60	5.6	6.30	12.96	2.1

* Middle-level change of several used in study.
† Final values after multiple iterations.
‡ Average of two levels of tree plantings.

(Kahneman et al., 1990, p. 1327; see also Kahneman et al., 1990, p. 56)

The Endowment Effect

- **The Endowment Effect** is:
  - An attempt to explain disparity between WTP and WTA
- *the increased value of a good to an individual when the good becomes part of the individual's endowment*
- Specific manifestation of Loss Aversion:
  - a good is evaluated as a loss when it is given up and as a gain when it is acquired
  - on average, induce a higher dollar value for owners than for potential buyers
  - reducing the set of mutually acceptable trades (Kahneman et al., 1990, pp. 56–57; Thaler, 1980)

Group "Market"

- Left hand side of the room are buyers
- Right hand side of the room are sellers

Travel Mugs

Paired Market

- In Pairs
  - Person on the left is the buyer
  - Person on the right is the seller

Paired Market

Open Market


Sharpie
GEL
Highlighter/Surligneur
ADVANCED
Sharpie GEL
Gel Stick
Surligneur gel

Open Market

- Everyone on the Left is a buyer
- Everyone on the right is a seller
  - Decide on a price
  - Products will be “sold” on an “open market”
  - Conventional economic analysis predicts that one-half of the goods should be traded in voluntary exchanges

Open Market

- Experimenter will collect the responses and establish a "market price"
  - buyers who exceed market price get to buy
  - Sellers who were below the market price get to sell
- Basis of the methods employed by Kahneman et al. (1990)

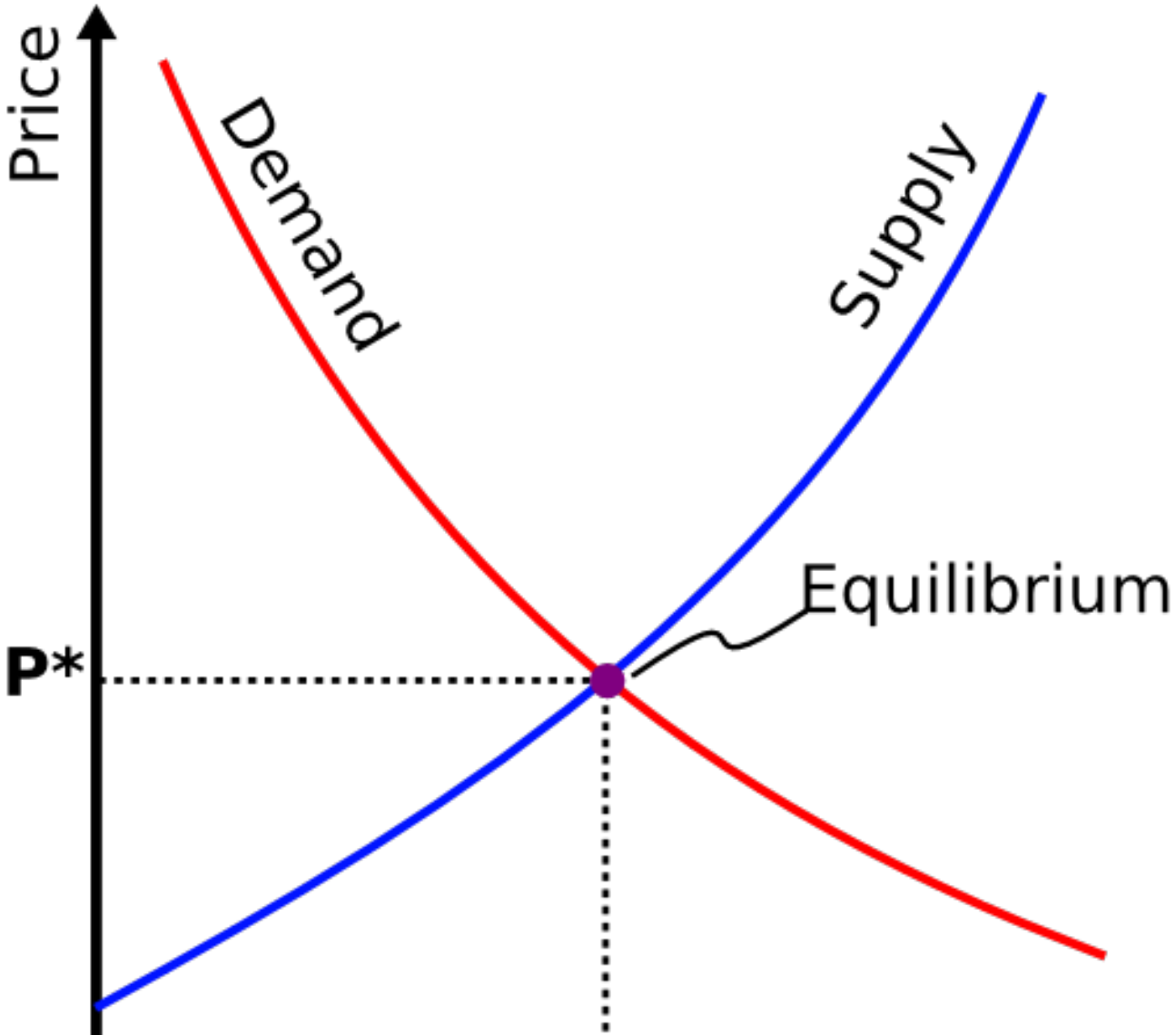
Testing Endowment Effect using "Open Markets"

- Supply and Demand linked to willingness to pay/willingness to accept
- The higher people are willing to pay, the greater the demand
- The lower people are willing to accept the greater the supply
- Supply $\uparrow \downarrow$ Demand
- Supply $\downarrow \uparrow$ Demand
- WTP $\uparrow \downarrow$ WTA
- WTP $\downarrow \uparrow$ WTA
- market price is the price at which supply $=$ demand
- WTP $=$ WTA

Supply and Demand

- Assuming no effect for ownership:
  - The supply and demand curves should be mirror images of each other
  - intersecting at their common median
  - Market Price

Supply and Demand



Hypotheses for the Current Studies

- The **null hypothesis** is:
  - half of the goods provided should change hands
  - Label this predicted volume V^*.
- Alternative hypothesis (If there is an endowment effect)
  - The value of the good will be higher for sellers than for buyers
  - and observed volume V will be less than V^*
- The ratio V/V^* provides a unit-free measure of the undertrading that is produced by the effect of ownership on value
- To test the hypothesis that market experience eliminates undertrading, the markets were repeated several times (Kahneman et al., 1990, p. 57)

Studying Endowment Effects

Studying Endowment Effects

- Experimental condition:
  - Buyers and Sellers
  - Real objects for trading
- Control Condition
- In groups:
  - Identify potential candidates for a suitable control condition

Studying Endowment Effects (Control condition)

- Induced value tokens:
  - Widely used in studies of Market behaviour
- Notional token traded in the place of real money
- Token has a private redemption value
  - Assigned to individual participants by the Experimenter (Kahneman et al., 1990, p. 57; see also V. L. Smith, 1976)
- Could be compared to poker chips

Study 1

Study 1 Overview

- Participants:
  - 44 undergraduate students (Cornell University)
- 11 Markets conducted
  - Markets 1 - 3: induced value tokens
  - Markets 4 - 7: Cornell coffee mugs
  - $6 in campus shop
  - Markets 8 - 11: ballpoint pen
  - $3.98

Study 1 Instructions

In this market the objects being traded are tokens. You are an owner, so you now own a token [You are a buyer, so you have an opportunity to buy a token] which has a value to you of $x. It has this value to you because the experimenter will give you this much money for it. The value of the token is different for different individuals. A price for the tokens will be determined later. For each of the prices listed below, please indicate whether you prefer to: (1) Sell your token at this price and receive the market price. [Buy a token at this price and cash it in for the sum of money indicated above.] (2) Keep your token and cash it in for the sum of money indicated above. [Not buy a token at this price.] For each price indicate your decision by marking an X in the appropriate column.

Study 1 Prices (induced value token)

- Distribution of values: ranging from \$0.25 to \$8.75 in steps of \$0.50 prepared for both buyers and sellers

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At a price of \$8.75 I will sell _____ I will not sell _____

At a price of \$8.25 I will sell _____ I will not sell _____

- Marked with an X

Study 1 Procedure

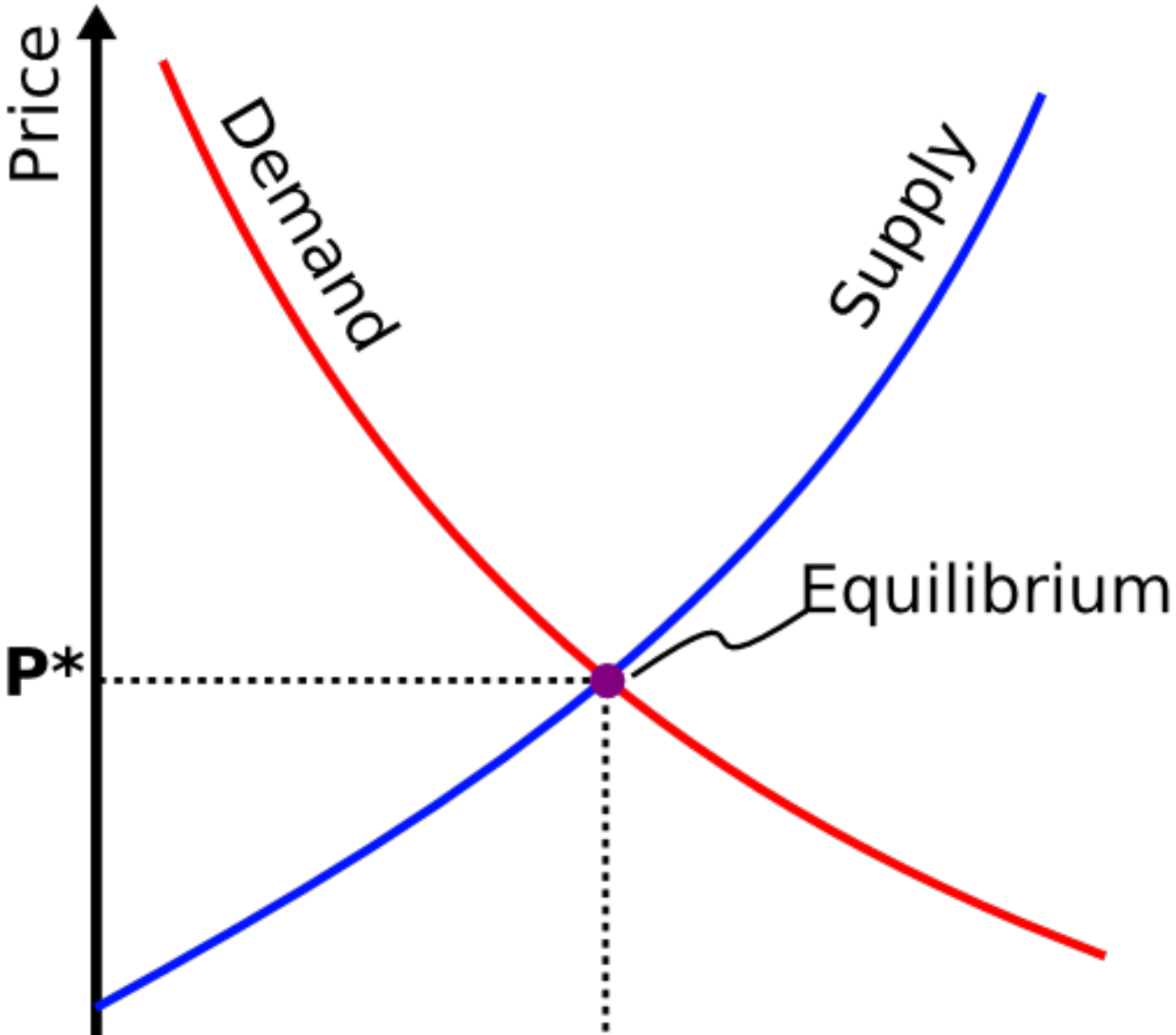
- Experimenter collected all the forms after each market period
- Calculated and announced:
  - The Market Clearing Price
  - The number of trades
  - Presence or absence of excess demand or supply at the market clearing price

Study 1 Mugs

- Participants receive a mug (Marked $6)
- Conducted 4 times
- After 4th trial
  - One of the 4 trials selected at random and all trades would be implemented
  - Sellers $<$ market price get to sell
  - Buyers who offered market price or higher get to buy
- Repeated trials allow for learning/experience

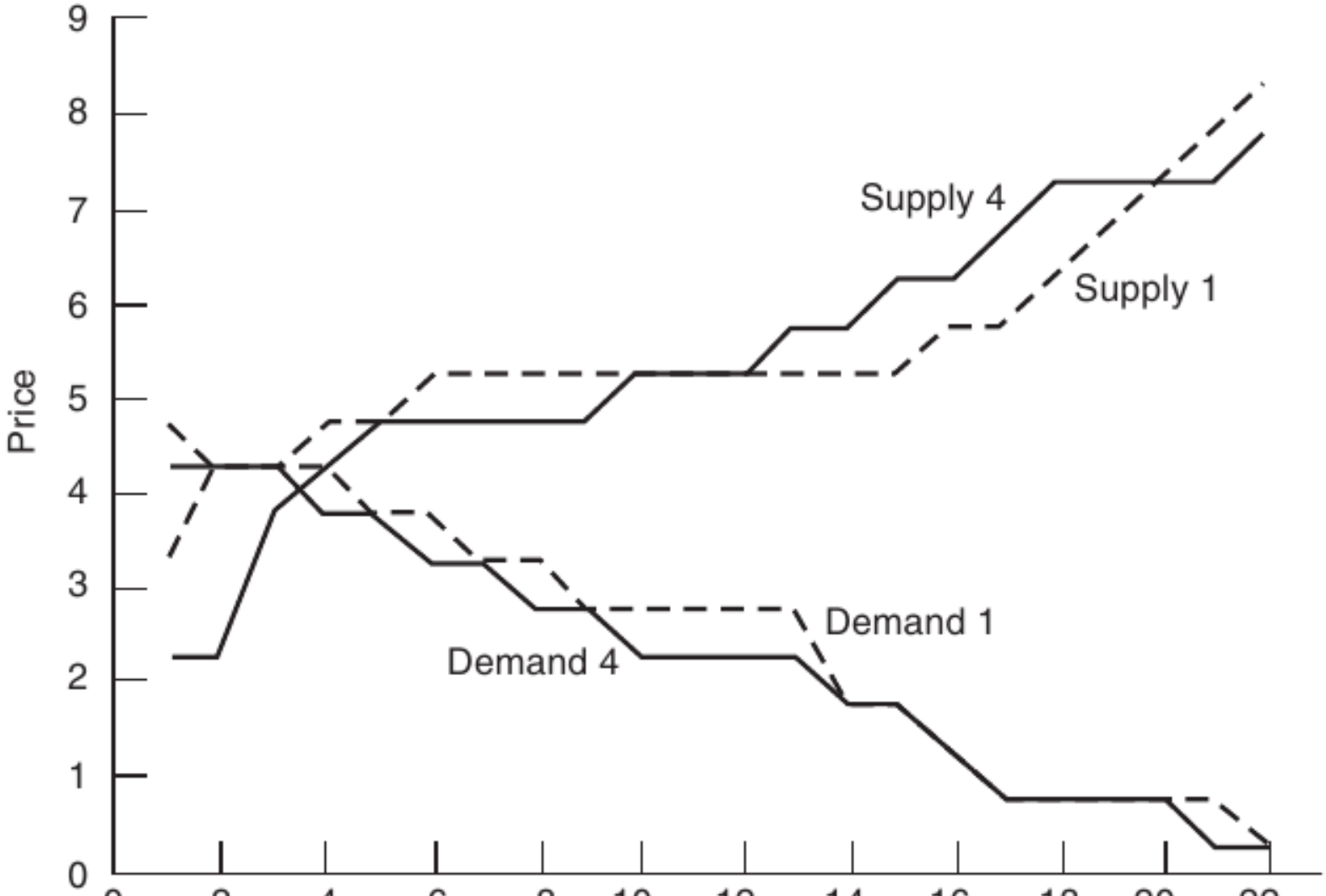
Recall Supply and Demand Curve

Recall Supply and Demand Curve



Supply and Demand Curve: Mugs

Supply and Demand Curve: Mugs



Study 1 Pens

- Buyers in ***Mugs*** receive a pen (marked $3.98)
- Instructions...

Study 1 Pens (instructions)

You now own the object in your possession. [You do not own the object that you see in the possession of some of your neighbors.] You have the option of selling it [buying one] if a price, which will be determined later, is acceptable to you. For each of the pos- sible prices below indicate whether you wish to: (1) sell your object and receive this price [Pay this price and receive an object to take home with you], or (2) keep your ob- ject and take it home with you. [Not buy an object at this price.] For each price indicate your decision by marking an X in the appropriate column.

Study 1 Results

TABLE 2.2
Results of Experiment 1

Induced-Value Markets				
Trial	*Actual Trades*	*Expected Trades*	*Price*	*Expected Price*
1	12	11	3.75	3.75
2	11	11	4.75	4.75
3	10	11	4.25	4.25

(Kahneman et al., 1990)

Study 1 Results

Consumption Goods Markets				
Trial	*Trades*	*Price*	*Median Buyer Reservation Price*	*Median Seller Reservation Price*
	Mugs (Expected Trades = 11)			
4	4	4.25	2.75	5.25
5	1	4.75	2.25	5.25
6	2	4.50	2.25	5.25
7	2	4.25	2.25	5.25
	Pens (Expected Trades = 11)			
8	4	1.25	.75	2.50
9	5	1.25	.75	1.75
10	4	1.25	.75	2.25
11	5	1.25	.75	1.75

(Kahneman et al., 1990)

Study 1 Conclusions

- Induced value - median selling price = median buying price
  - $V/V^* = 1.0$ across 3 trials
- Consumption goods median selling price > 2(median buying price)
  - V/V^* mugs $= .20$
  - V/V^* pens $= .41$
- No change in observed volume across repeated trials

Study 2

Study 2 Procedure

- Participants:
  - 38 undergraduates at Cornell
- Identical procedure:
  - but:
  - Second consumption good was a pair of folding binoculars in a cardboard frame
  - available at the bookstore for $4.00

Study 2 Results

TABLE 2.3
Results of Experiment 2

	Induced-Value Markets			
Trial	*Actual Trades*	*Expected Trades*	*Price*	*Expected Price*
1	10	10	3.75	4.75
2	9	10	4.75	4.25
3	7	8	4.25	4.75

Figure 7: endowment

(Kahneman et al., 1990)

Study 2 Results

Consumption Goods Markets				
Trial	*Trades*	*Price*	*Median Buyer Reservation Price*	*Median Seller Reservation Price*
	Mugs (Expected Trades = 9.5)			
4	3	3.75	1.75	4.75
5	3	3.25	2.25	4.75
6	2	3.25	2.25	4.75
7	2	3.25	2.25	4.25
	Binoculars (Expected Trades = 9.5)			
8	4	1.25	.75	1.25
9	4	.75	.75	1.25
10	3	.75	.75	1.75
11	3	.75	.75	1.75

Study 3

Study 3 Procedure

- Participants
  - 26 undergraduates at Simon Fraser University
- Similar to previous studies
  - Only pens (4 markets)
  - Asked to provide max/min buying/selling prices (instead of the series of yes/no questions)
  - First 3 markets for pens were "practice"
  - 4th market was binding

Study 3 Results

TABLE 2.4
Results of Experiments 3 and 4

Trial	*N*	*Object*	*Actual Trades*	*Expected Trades*	*Ratio of Seller Median Value to Buyer Median Value*
			Experiment 3		
1	26	Induced	5	6.5	
2	26	Pen	2	6.5	6.0
3	26	Pen	2	6.5	6.0
4	26	Pen	2	6.5	5.0
5	26	Pen	1	6.5	5.0

Figure 9: endowment

(Kahneman et al., 1990, p. 63)

Study 4

Study 4 Procedure

- Participants
  - 74 undergraduates at Simon Fraser University
- Similar to previous studies
  - Only mugs (5 markets)
  - Asked to provide max/min buying/selling prices (instead of the series of yes/no questions)
  - Mug market selected at random

Study 4 Results

Experiment 4					
1	74	Induced	15	18.5	
2	74	Induced	16	18.5	
3	74	Mug	6	18.5	3.8
4	74	Mug	4	18.5	2.8
5	72	Mug	4	18	2.2
6	73	Mug	8	18	1.8
7	74	Mug	8	18.5	1.8

(Kahneman et al., 1990)

Study 5: Misrepresentation

Study 5 Rationiale

- Participants aware of how market price would be calculated
  - May try to influence the price
- Study 5: similar to previous studies but
  - price selected at random

Study 5 Instructions

"After you have finished, one of the prices listed below will be selected at random and any exchanges will take place at that price. If you have indicated you will sell at this price you will receive this amount of money and will give up the mug; if you have indicated that you will keep the mug at this price then no exchange will be made and you can take the mug home with you.

. . . Your decision can have no effect on the price actually used because the price will be selected at random"

Study 5 Procedure

- 6 tutorial groups at Simon Fraser University
  - ($N = 59$)
- 2 induced value markets
- 1 real exchange market (mugs)
- Price procedure: as in experiments 1 and 2
  - selected from possible prices ranging from \$0.00 to \$9.50
  - listed by increments of \$0.50.

Study 5 Results

- Induced value markets:
  - 14 expected exchanges at $4.75
  - 13 actual trades at this price
- Induced value market 2
  - 17 expected exchanges at $5.75
  - 16 actual trades at this price

Study 5 Results

- Mugs
  - 14.5 expected exchanges (random price)
  - only 6 trades
- Median selling price \$5.75 ($M = \$5.78$)
- Median buying price \$2.25 ($M = \$2.21$)

Studies 6 and 7: Reluctance to Buy/Sell

Study 6 Methods

- 77 Simon Fraser Students
- Similar to previous studies
- Inclusion of a "chooser"
  - For each price
  - Choose between mug and cash

Study 6 Results

- Same pattern of under trading as Previous Studies
  - 12.5 trades expected
  - Only 3 took place ($V/V^* = .24$)
- The median valuations were \$7.12 for sellers, \$3.12 for choosers, and \$2.87 for buyers
- Choosers' responses similar to Buyers'

Study 7 Methods

- 117 students at University of British Columbia
- Identical to Study 6
  - Price tag left on the mug

Study 7 Results

- 19 trades were expected on the basis of valuation equivalence
  - Only one was concluded on the basis of actual valuations ($V/V^* = .05$)
- The median valuations were \$7.00 for sellers, \$3.50 for choosers, and \$2.00 for buyers

Study 8

Study 8 Method

- Game of Nim
  - Winners got a chocolate bar
- Induced-value bargaining session:
  - Losers got a ticket "worth $3"
  - could be redeemed or sold to partner
  - Winners told they would receive $5 for the ticket if they could buy it

Study 8 Initial Results

- 35 pairs of participants
  - 29 agreed to an exchange ($V/V^* = .83$)
- The average price paid for the tickets was \$4.09
  - 12 of the exchange prices being exactly \$4.00.
- Ticket holders now have cash
  - (more cash than Bar holders \$3.90 vs \$.76)

Study 8 Part 2

- After the ticket exchanges, owners of the chocolate bars were told that they could sell them to their partners if a mutually agreeable price could be determined (procedures used for the tickets were once again applied to these bargaining sessions)

Study 8 Part 2 - Results

- 17.5 expected trades
- Only 7 trades observed $V/V^* = .4$
- Still true if participants who did not trade tickets are omitted ($N = 6$)
  - 14.5 expected trades $\rightarrow$ 6 actual trades $V/V^* = .414$

Conclusions

Endowment Effect

- Manifestation of Loss aversion
- Emerges due to *ownership* / *posession* / ***endowment***
- Acquiring a good/service = gains
- Selling/parting with a good = losses
- Leads to *undertrading*

In-class Activity

Group Discussion Topcics

- The endowment effect, as a manifestation of loss aversion provides evidence that humans are not rational.
- Critique the methods used in the studies described.
- Is there another explanation for the pattern of responses that purportedly show the endowment effect?
- What questions have you got about the endowment effect that you will investigate after this lecture?

References

References

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